

AMENDMENT TO THE CLAIMS

1. (Currently Amended) A flow-through conductivity sensor, the sensor comprising:

a flow conduit;

first and second electrodes disposed relative to the flow conduit to contact process fluid proximate the conduit and convey an electrical current between the first and second electrodes through the process fluid;

a current return conductor coupled to the first and second electrodes; and

at least one toroid arranged to interact with the current return conductor to measure current flowing between the first and second electrodes through the process fluid provide an indication of process fluid conductance.

2. (Original) The sensor of claim 1, wherein the at least one toroid is disposed about the current return conductor.

3. (Original) The sensor of claim 2, and further comprising:

a second toroid disposed about the current return conductor; and

wherein one toroid is a drive toroid and the other toroid is a detect toroid.

4. (Original) The sensor of claim 2, wherein the at least one toroid is configured as a transformer.

5. (Original) The sensor of claim 2, wherein the at least one toroid has a pair of windings, and one of the pair of windings is in series with the current return conductor.

6. (Original) The sensor of claim 1, wherein at least one of the first and second electrodes is a contact ring.

7. (Original) The sensor of claim 1, wherein one of the first and second electrodes includes a conductive process pipe.

8. (Original) The sensor of claim 7, wherein the other of the first and second electrodes includes a contact ring.

9. (Previously Presented) The sensor of claim 7, wherein the other of the first and second electrodes includes a metal pipe disposed between a pair of insulating pipes, wherein each insulating pipe includes insulating ends and an insulating liner.

10. (Currently Amended) A method of measuring conductivity of a process fluid in a flow conduit, the method comprising:

contacting the process fluid with first and
second electrodes coupled together by
a current return path;

generating an electrical current between the first and
second electrodes in the process fluid with a
drive toroid; and

measuring current through the current
return path, the measured current through the
current return path being indication of the
generated current.

11. (Original) The method of claim 10, wherein measuring includes coupling a receive toroid to the current return path.

12. (Original) The method of claim 10, wherein generating includes coupling the drive toroid to the current return path.

13. (Original) The method of claim 10, wherein measuring includes directly measuring impedance of a toroid coupled to the current return path.

14. (Cancel)

15. (Cancel)

16. (Cancel)

17. (Cancel)

18. (Cancel)

19. (Cancel)

20. (Cancel)

21. (Cancel)

22. (Cancel)